A classification of the Foraminifera adapted from Mr. H. B. Brady's "Notes on Reticularian Rhizopoda" is given (p. ix), and a table (p. xiv) showing their range in time, thus affording a general view of the occurrence and succession of the most important genera from the Silurian epoch to the present time.

A combined geologico-geographical arrangement is adopted in this Catalogue, with the view of aiding both a special and comprehensive study of the fossil Foraminifera and allied Rhizopods preserved in the British Museum, in which arrangement certain geographical lines are followed, beginning with the British Islands, and going eastward, under the several geological headings, and then returning to the west for a new line, the successive stages of each geological system being noted in upward order.

In the supplementary notes are some valuable remarks on the more important groups mentioned in the preceding part of the Catalogue, as *Eozoon*, *Receptaculites*, *Fusulina*, *Orbitolina*, *Nummulites*, and on the Foraminifera of the Chalk of England, of that of the north of Ireland, and also of the London Clay at Hampstead.

A geographical index and an index of the genera and species are also given; so that it is hoped this Catalogue may be the means of increasing the usefulness of this portion of the national collection.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

April 26, 1882.—J. W. Hulke, Esq., F.R.S.,
President, in the Chair.

The following communications were read:—

1. "On Fossil Chilostomatous Bryozoa from Mount Gambier, South Australia." By Arthur W. Waters, Esq., F.L.S., F.G.S.

The author gave a descriptive list of 66 species of Bryozoa, belonging to the suborder Chilostomata, from the collection of the Geological Society and of Mr. Etheridge, Jun.; of these, 15 were considered to be new, 28 are now found living, of which 23 in Australian seas, 25 were found in the material previously described from S.W. Victoria, 2 were considered identical with European chalk forms, 11 with Miocene, 12 with Pliocene, and 21 have been found in a collection from Bairnsdale, Gippsland.

Mr. Waters states that the collections in his hand from S.W. Victoria, Mount Gambier, and Bairnsdale will together yield about 200 species of Chilostomata and Cyclostomata.

2. "*Thamniscus*: Permian, Carboniferous, and Silurian." By George W. Shrubsole, Esq., F.G.S.

After a sketch of the genus, represented by one Permian, possibly two Carboniferous, and one Silurian species, the author discussed certain peculiarities claimed for the Permian form by the founder of the genus, Prof. King, viz. certain "denticles, vesicles, and hemispheric bodies, similar to those observed in *Cellaria salicornea*." These the author failed to find, but observed on the cell-face of this form a strong defensive spine, hollow at the base, which, when worn, gave an appearance which resembled the above structures. A denticle-like process also seems only to be the unequal wearing down of the cell-mouth. The author redescribed the genus, as well as a new Silurian species, for which he proposed the name of *Thamniscus antiquus*. It is from the Dudley limestone, and is in the Woodwardian Collection at Cambridge. It is not rare, but is generally too fragmentary for description.

3. "On the Occurrence of a New Species of *Phyllopora* in the Permian Limestones." By George W. Shrubsole, Esq., F.G.S.

The specimen on which this species is founded is mentioned in an early paper by Prof. Sedgwick on the Magnesian Limestone. It was afterwards named *Fenestella ramosa* by Prof. Phillips, and considered by Prof. King identical with *Thamniscus dubius*. But with neither of these genera has it any relationship, as it really belongs to King's genus *Phyllopora*, founded to include certain Polyzoa formerly referred to *Retepora*, a modern genus whose characteristics cannot be detected among the remains of the Palæozoic Polyzoa. The author described the characters of the species, and traced the history of the genus, which, in its range from Lower Silurian to Permian times, is characterized by two distinct types of species.

May 10, 1882.—J. W. Hulke, Esq., F.R.S.,
President, in the Chair.

The following communications were read:—

1. "On the Relations of *Hybocrinus*, *Baerocrinus*, and *Hybocystites*." By P. Herbert Carpenter, Esq., M.A. Communicated by Prof. P. Martin Duncan, M.B., F.R.S., V.P.G.S.

The author discussed the relations of *Apiocrinus dipentas*, Leucht., and of *Baerocrinus Ungerni*, Volborth, both from the Lower Silurian of Russia, to *Hybocrinus*, Billings, of the American Trenton limestone.

Ap. dipentas was regarded as a true *Hybocrinus*, as it was by Volborth and Schmidt; but the author followed Volborth and Grewingk in considering *Baerocrinus* a distinct generic type. The calyx consists of five basals supporting five radials, of which only three bear arms, while there is no indication of any anal system, unless it be the so-called Volborth's organ. *Baerocrinus* is probably to be regarded as a permanent larval form, which has only developed arms on three of its radials.

Hybocystites problematicus, from the Lower Silurian of Kentucky, which is supposed by Wetherby to be an intermediate form between the Crinoids and the Cystids, is believed by the author to be more closely allied to the Blastoids than to the Cystids. The three so-called arms are merely upward prolongations of the radials, which are segmented in the same way as the downward extending radials are in *Pentacrinus briareus.* They are not arms like those of *Hybocrinus* and other Crinoids. Of the five ambulacra that diverge from the peristome, the right and left anterior ones pass directly downwards from the summit onto the corresponding radials, and thence onto the basals. The other three ascend the inner faces of the short radial extensions, pass over their tops and down their outer faces, where they have been described as "more or less obscure furrows, of which nothing further is known." In some cases they reach the basals, and in others not, exhibiting a considerable amount of variation both in this and in other respects. There are therefore five recurrent and appressed ambulacra, and not two only, together with three arms, like those of Crinoids.

2. "On the Madreporaria of the Inferior Oolite of the Neighbourhood of Cheltenham and Gloucester." By R. F. Tomes, Esq., F.G.S.

The author called attention to the observations of Milaschewitsch on "Rejuvenescence" in corals, published in vol. xxi. of the Palæontographica, and explained its nature as opposed to "gemmation." He suggested that, in describing corals, the following classification of the costæ should be adopted:—

1. *Mural costæ*=those which appear on the wall, whether of simple or compound species.
2. *Septal costæ*=those which are a prolongation of the septa.
3. *Intercalicular costæ*=those which cover the cœnenchyma between the calices.

He adopted in general Dr. Wright's views as to the stratigraphical position of the coralligenous deposits in the Gloucestershire Inferior Oolite, and gave a tabular statement of the distribution of the species in the several coral-beds, pointing out that each of these has its own species, which do not pass much from one to the other. He recorded about sixty species, many of which were described as new, and proposed two new genera (*Phyllogyra* and *Phylloseris*), besides introducing five or six genera previously characterized on the continent, but not recognized in England—namely *Donacosmilia*, *Confusastræa*, *Chorisastræa*, *Oroseris*, and *Dimorpharæa.*

The author referred especially to some so-called *Thecosmiliæ*, such as *T. gregaria*, and insisted that they should be removed to the genus *Chorisastræa*, as they increase by gemmation at the base only of the corallum, and never by fissiparity as in the type of *Thecosmilia* (namely *T. trichotoma* from the Corallian of Nattheim). He remarked upon the characters of the genus *Heterogyra*, Reuss, and its allies, including his new genus *Phyllogyra*; and further indicated that *Thamnastræa* and allied genera have been removed by Milaschewitsch from the Fungidæ and placed among the Poritidæ, in consequence of their perforated septa, an alteration in which he agreed.

3. "On the Exploration of two Caves in the Neighbourhood of Tenby." By Ernest L. Jones, Esq. Communicated by Prof. W. Boyd Dawkins, F.R.S., F.G.S.

The caves noticed in this paper were that of Coygan, near Laugharne, partially described by Dr. Hicks in the 'Geological Magazine' in 1867, and a cave known as Hoyle's Mouth, reported on to the British Association in 1860 by the Rev. Gilbert N. Smith. Both caves were rock-fissures. The Coygan cave had been a Hyæna-den, as was shown by the deposits of crushed bones and coprolites trodden down into a solid mass by the passing of the animals. Besides remains of Hyæna, it furnished those of Horse, Mammoth, Tichorhine Rhinoceros, Elk, Red Deer, Roe Deer, Reindeer, Cave Bear, Cave Lion, *Bos primigenius*, Wolf, and Fox. The presence of Hippopotamus was doubtful. Besides these animals, the presence of Palæolithic man in the cave was indicated by some cut bones and by two flint-flakes evidently chipped by man. In the second cave, Hoyle's Mouth, the Hyæna, the Cave Bear, &c. were wanting, the place of the latter being taken by the common Brown Bear. In one part remains of an old hearth were found; and the whole contents of the fissure pointed to a Neolithic date. At one time the cave appears to have been used as a place of sepulture.

May 24, 1882.—J. W. Hulke, Esq., F.R.S.,
President, in the Chair.

The following communication was read:—

1. "On a remarkable Dinosaurian Coracoid from the Wealden of Brook, in the Isle of Wight, preserved in the Woodwardian Museum of the University of Cambridge, probably referable to *Ornithopsis*." By Prof. H. G. Seeley, F.R.S., F.L.S., F.G.S., &c.

The specimen described was obtained in 1866 by Mr. Henry Keeping, midway between the fossil forest at Brook Point and Brook Chine, about 10 feet above high-water mark. The author stated that it was the largest Dinosaurian coracoid known to him, that it differed in important characters from that of *Iguanodon*, and that, of described genera, it most probably belonged to *Ornithopsis*. The bone is from the right side, and nearly perfect; its length is about 16⅓ inches, and its greatest breadth about 14 inches; the humeral articular surface is nearly 8 inches, and the suture for the scapula about 10½ inches long. The bone is moderately thick, slightly convex externally and concave within, thickened at the humeral articulation. The nearest approach to this coracoid is made by that of the skeleton referred to *Hylæosaurus*, from the Wealden of Tilgate; but in it the distal portion of the bone is more prolonged, the median portion is less thickened, and the foramen is placed behind the middle of the humeral border, far away from the scapular margin, near which it is situated in the present bone. From the coracoid of *Iguanodon* it differs by the absence of the notch between the humeral and scapular surfaces, which there represents the foramen in this bone. In some respects it resembles certain American types, such as *Morosaurus,* and especially *Camptonotus.*

MISCELLANEOUS.

On the Unpaired Eye of the Crustacea. By M. Hartog.

It is well known that in most Crustacea, besides the two compound eyes (which are fused together in the Cladocera), there exists an unpaired median eye. It exists alone in most of the Copepoda and in the naupliiform larvæ of all orders; it is even seen in the phyllosomatous larvæ of the Loricate Decapods. Wherever the two kinds of eyes coexist in the adult but not in the newly-hatched larva, the unpaired eye is the first formed. It must therefore be regarded as the primitive eye of the Crustacea.

The structure of this organ has not been sufficiently studied. Claus has demonstrated that it is formed in all cases of a central pigmented mass, in which are half immersed three lenticular bodies or " crystalline spheres "—two lateral, and one central. By investigating the anatomy of *Cyclops* and *Diaptomus* by the method of thin sections, I have ascertained that this organ is of a much more complicated composition than had been supposed. The pigmented mass is, so to speak, structureless; the colouring-granules in it are especially placed at the surface contiguous to the " crystalline spheres." Each sphere is composed of radiating elements or optical bacilli, the inner ends of which are applied against the pigmented mass, while the peripheral segments contain a nucleus. The eye thus described is situated upon the terminal process of the brain, from which the optic nerves originate, one for each sphere; the nerve, instead of penetrating into the pigmented mass, *skirts the outer surface of the crystalline sphere, and penetrates it directly* not far from its hinder margin.

Claus figured an analogous structure in the unpaired eye in the Phyllopoda (see his memoir on the development of *Apus cancriformis* and *Branchipus stagnalis*); but he did not indicate its true significance. I have recently bred these same species, and have discovered in them a perfect analogy of structure with that just described in the Copepoda.